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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/684,116	10/10/2003	Christopher R. Wren	CR-1421	2743

7590 09/27/2006

Patent Department
Mitsubishi Electric Research Laboratories, Inc.
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EXAMINER	
OCHOA, JUAN CARLOS	
ART UNIT	**PAPER NUMBER**
2123	

DATE MAILED: 09/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/684,116	Applicant(s) WREN, CHRISTOPHER R.
	Examiner Juan C. Ochoa	Art Unit 2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1–21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date *10/10/03*.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1–21 are presented for examination.

Specification

2. The disclosure is objected to because of the following informalities:

3. Page 11, paragraph [057], includes the phrase “Activity Predication”. Meaning is unclear. Should Examiner interpret as “Activity Prediction”? Page 11, paragraph [058], states ”As shown in FIG. 6, the co-occurrence matrices can also be used to predict future activities”.

Claim Objections

4. Claim 17 is objected to because of the following informalities:

5. Claim 17 includes the term “sensor detects events associated with a future activity”, meaning is unclear. Examiner interprets as "sensor detects events associated with predicting a future activity " for examination purposes.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 1–9, 11–14, and 17–21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stauffer and Grimson, (Stauffer hereinafter), Learning Patterns of Activity Using Real Time Tracking, taken in view of Lee, Romano, and Stein, (Lee hereinafter), Monitoring activities from multiple video streams: Establishing a common coordinate frame.

9. As to claim 1, Stauffer discloses a method for modeling movement of users in an environment (see page 747, col. 1, lines 1–3), the environment including sensors connected in a network (see "forest of sensors" in page 747, col. 1, last paragraph, lines 1–3), comprising: detecting events due to movement of the users at the sensors (see page 747, col. 2, lines 15–16); labeling each event (see page 747, col. 2, lines 17–18) according to a particular sensor and time of the event (see "classification of a day of silhouette sequences" in page 756, col. 1, last paragraph, lines 1–4); summing the events for each sensor into a corresponding histogram time interval bin (see page 756, col. 2, last paragraph and "histograms" in Fig. 10); generating a plurality of co-occurrence matrices from the histograms according to $C_{i,j}$, $\delta = {}_{t=0}\Sigma^{T} H_{i,t} H_{j,t+\delta}$ (see page 753, col. 2, Section No. 7.3, 1st and 3rd paragraphs and formula (13)),where i and j

represent each possible pair of sensors (see page 753, col. 2, lines 1–2 and "each possible pair" in page 753, col. 2, 2nd paragraph), T is a total time for the detecting (see "C_{total} and Z" in page 753, col. 2, lines 1–20), t represents a particular time, and H represents the histogram time interval bins (see "$p_c()$" in page 753, col. 1, next to last paragraph, lines 3–4).

10. While Stauffer discloses almost all of the instant invention, Stauffer lacks fails to disclose time calibration via time-offsets.

11. Lee discloses time-offsets, i.e. δ in the co-occurrence matrices. (see page 761, col. 2, Section No. 4.4, 1st paragraph).

12. Stauffer and Lee are analogous art because they are both related to modeling activity using video streams.

13. Therefore, it would have been obvious to one of ordinary skill in this art at the time of invention by applicant to utilize the time-offsets of Lee in the method of Stauffer because Lee models the activity in a large site using video streams from multiple cameras (see page 758, col. 1, Introduction, lines 1–3), and as a result, reports the following improvements over his prior art: an unsupervised method for coordinating the activities detected in a distributed, uncalibrated, set of cameras into a single global coordinate frame, which uses tracking data from moving objects to solve the correspondence problem between cameras, and which allows multiple views to be coordinated to a single view or to a global, ground plane view (see page 767, col. 1, Conclusions, 2nd paragraph, lines 1–7).

14. As to claim 2, Stauffer discloses a method in which the environment is inside a building (see “indoor sites” in page 747, col. 2, lines 1–2).

15. As to claim 3, Stauffer discloses a method in which the environment is an open space (see “outdoor sites” in page 747, col. 2, line 3).

16. As to claims 4–6, Stauffer discloses a method in which the network is wired/wireless and includes wired and wireless sensors (see page 747, col. 2, lines 2–3).

17. Claims 4–6 have been given a broad reasonable interpretation by the Examiner. The Examiner notes that the steps disclosed in (page 747, col. 2, lines 2–3) are functionally equivalent to the results produced by the steps expressly claimed in Applicant's dependent claims 4–6. Therefore, the “product” that is produced by performing the steps disclosed in dependent claims 4–6 is the functional equivalent of the “product” that is produced in (page 747, col. 2, lines 2–3). Although the “steps” by which the end result is different, the final result for the “steps” is identical.

18. As to claim 7, Stauffer discloses a method in which the sensors have a resolution of one bit to detect the events (see “binary“ in page 752, col. 1, Section No. 6, lines 4–6).

19. As to claim 8, Stauffer discloses a method in which a sensing modality is selected from the group consisting of infra-red, thermal, ultrasonic, light, radar, sonar, microwave, pressure, on-off switch, and combinations thereof (see “lighting” in page 757, col. 1, next to last paragraph, lines 1–2).

20. As to claim 9, Stauffer discloses a method in which the sensors are globally distributed in the environment in an ad-hoc arbitrary pattern (see page 747, col. 1, last lines 3).

21. As to claim 11, Stauffer discloses a method comprising: determining, for each possible pair of sensors, a distance between the pair of sensors (see "Self-calibration" in page 747, col. 2, lines 11–12); and mapping the distances to geometry of the sensors (see page 747, col. 2, lines 13–14).

22. As to claim 12, Lee discloses a method in which the summed events include peaks, and each peak reflects a relative time-offset between a particular pair of sensors (see page 761, col. 2, Section No. 4.4, 1st paragraph, last 5 lines and Fig. 2).

23. As to claim 13, Stauffer discloses a method in which the determining further comprises: applying a consistent average velocity of the movement of the users over time to the relative time-offset between the pair of sensors (see "speed" in page 752, col. 1, Section No. 6, lines 2–4).

24. As to claim 14, Stauffer discloses a method in which the mapping uses multi-dimensional scaling (see "speed" in page 752, col. 1, Section No. 6, lines 2–4). As per "By applying an estimated velocity of the users, the geometry can be scaled to real-world dimensions" in (application description page 11, paragraph [055], last 2 lines), Examiner interprets multi-dimensional scaling as estimated velocity.

25. As to claim 17, Stauffer discloses a method in which a particular sensor detects events associated with a future activity, and further comprising: determining, from the co-occurrence matrices, distributions of probabilities that the terminating event occurs

based on the events detected by all of the other sensors other than the particular sensor (see page 754, col. 1, lines 9–18); and summing the distributions of probabilities to predict the probability that the future activity will occur prior to detecting the terminating event while detecting the events (see page 754, col. 1, last paragraph).

26. As to claim 18, Stauffer discloses a method in which there is one distribution for each other sensor (see "Once the parameters for the pmfs have been determined, any exclusive set of them can be used as classifiers" in page 754, col. 1, last paragraph, lines 1–2).

27. Claim 18 has been given a broad reasonable interpretation by the Examiner. The Examiner notes that the step disclosed in (page 754, col. 1, last paragraph, lines 1–2) is functionally equivalent to the results produced by the step expressly claimed in Applicant's dependent claim 18. Therefore, the "product" that is produced by performing the step disclosed in dependent claim 18 is the functional equivalent of the "product" that is produced in (page 754, col. 1, last paragraph, lines 1–2). Although the "step" by which the end result is different, the final result for the "step" is identical.

28. As to claims 19–21, these claims recite a system for performing the Stauffer–Lee method of claims 1, 11, and 17. Stauffer discloses a system (see page 747, col. 1, lines 1–3) for performing a method that teaches claims 1, 11, and 17. Therefore, claims 19–21 are rejected for the same reasons given above.

29. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stauffer taken in view of Lee as applied to claim 14 above, and further in view of Yaron Caspi and Michal Irani, (Caspi hereinafter), Alignment of non-overlapping sequences

30. As to claim 10, while the Stauffer–Lee method teaches almost all of the instant invention as applied to claim 14 above, the Stauffer–Lee method lacks non-overlapping sensor ranges.

31. Caspi discloses a method in which ranges of some sensors are non-overlapping (see page 5, col. 2, last paragraph, lines 1–6).

32. Stauffer, Lee, and Caspi are analogous art because they are related to modeling activity using video streams.

33. Therefore, it would have been obvious to one of ordinary skill in this art at the time of invention by applicant to utilize the non-overlapping sensor ranges of Caspi in the Stauffer–Lee method because Caspi shows how two image sequences that have no spatial overlap between their fields of view can be aligned both in time and in space (see page 1, col. 1, lines 1–3), and as a result, Caspi reports the following improvement over his prior art: sequence alignment can be used to generate wide-screen movies from two (or more) narrow field-of-view movies (such as in IMAX movies) (see page 6, col. 2, last paragraph, lines 1–3).

34. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stauffer taken in view of Lee as applied to claim 14 above, and further in view of

Mark Steyvers, (Steyvers hereinafter), Multidimensional Scaling (see IDS dated 10/10/03).

35. As to claim 15, while the Stauffer–Lee method teaches almost all of the instant invention as applied to claim 14 above, the Stauffer–Lee method lacks using a stress measure.

36. Steyvers discloses a method comprising: evaluating a likelihood that a particular geometry conforms to the estimated distances using a stress measure $\Phi = \Sigma [d_{ij}-f(\delta_{ij})]$,where $f(\delta_{ij})$ is a non-metric, monotone transformation (see page 2, col. 1, lines 1–3).

37. Stauffer, Lee, and Steyvers are analogous art because they are related to modeling activity using video streams.

38. Therefore, it would have been obvious to one of ordinary skill in this art at the time of invention by applicant to utilize the stress measure of Steyvers in the Stauffer–Lee method because Steyvers utilizes Multidimensional Scaling (MDS), which describes techniques for proximity data analysis on a set of stimuli to reveal the hidden structure underlying the data (see page 1, col. 1, lines 1–4), and as a result, Steyvers reports the following applications of MDS: multidimensional representations resulting from MDS are also often useful as the representational basis for various mathematical models of categorization and/or identification (see page 1, col. 2, 2nd paragraph, lines 6–11).

39. As to claim 16, Steyvers discloses a method in which the stress measure rank-orders the distances between the pairs of sensors (see page 3, col. 1, lines 4–9).

Conclusion

40. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

41. Christopher R. Wren and Srinivasa G. Rao, "Self-Configuring, Lightweight Sensor Networks For Ubiquitous Computing" teaches contents of this application (see page 2, line 1). Examiner wonders about the exclusion of Mr. Srinivasa G. Rao.

42. Examiner would like to point out that any reference to specific figures, columns and lines should not be considered limiting in any way, the entire reference is considered to provide disclosure relating to the claimed invention.

43. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan C. Ochoa whose telephone number is (571) 272-2625. The examiner can normally be reached on 7:30AM - 4:00 PM.

44. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached on (571) 272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

45. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

*** 9/19/06

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9/20/07